Fundamental Surprise in the Application of Airpower

A Monograph

by

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Abstract

Fundamental Surprise in the Application of Airpower, by Lt Col Jason A. Mascetta, USAF, 39 pages.

Airpower means different things to different people. All of these interpretations are deeply rooted in context. For the airman, it is the ability to slip the limitations of ground combat and achieve a degree of operational reach and simultaneity few shackled to the earth could imagine. For the soldier, it can be a method to ensure freedom of maneuver, a way of seeing deep into enemy held terrain, or a tool to drastically shift the balance of force presented at the decisive point. The enemy's perspective, particularly when outmatched in the air, is more complicated and also the most important interpretation for an air planner to understand. Without a clear realization of how an enemy understands the air domain, planners are vulnerable to applying airpower in ways that prove to be less relevant than expected. This disconnect between expectation and reality leads to what theorist Zvi Lanir calls a "fundamental surprise." For an air planner, this will most likely mean a lack of operationally relevant solutions, and the inability to link tactical actions to the strategic sponsor's desired end state. To avoid this failed understanding air planners must ask: what modalities of thought have the potential to create fundamental surprise in the application of airpower?

This study will highlight approaches to planning and cognitive biases that steer air planners to internally focused interpretations of both context and meaning. Planning approaches based on meeting specific threats scenarios or using definitive friendly-force capabilities have the potential to prevent air planners from fully understanding the operational environment, and in particular how the enemy views the friendly force's strength with regards to airpower. Cognitive biases, including anchoring and adjustment bias, mirror-imaging bias, and blind spot bias, create failures in understanding of both context and meaning. These misunderstandings perpetuate a planner's view of reality that is no longer relevant to the enemy. This relevance gap is then realized when a plan fails, and the enemy can negate or avoid the friendly force's assumed advantages in the air. Two compelling examples of fundamental surprise in the application of airpower are the Israeli Air Force's experiences in the Yom Kippur War and the Second Lebanon War.

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Acronyms

EAF	Egyptian Air Force
IAF	Israeli Air Force
IDF	Israeli Defense Force
SAMS	Surface to Air Missile System

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Introduction

Airpower means different things to different people. All of these interpretations are deeply rooted in context. For the airman, it is the ability to slip the limitations of ground combat and achieve a degree of operational reach and simultaneity few shackled to the earth could imagine. For the soldier, it can be a method to ensure freedom of maneuver, a way of seeing deep into enemy held terrain, or a tool to drastically shift the balance of force presented at the decisive point. The enemy's perspective, particularly when outmatched in the air, is more complicated and also the most important interpretation for an air planner to understand. Without a clear realization of how an enemy understands the air domain, planners are vulnerable to applying airpower in ways that prove to be less relevant than expected. This disconnect between expectation and reality leads to what theorist Zvi Lanir calls a "fundamental surprise."

A fundamental surprise is the beginning of a process that reveals a mindset which is not relevant to reality. Fundamental surprise does not stem from failures in gathering, processing, or disseminating information, but from a failure in understanding. This inability to connect meaning to the input of information develops into a relevance gap, where the planner's mindset no longer represents reality from the enemy's perspective.[1] For an air planner, this will most likely mean a lack of operationally relevant solutions, and the inability to link tactical actions to the strategic sponsor's desired end state. To avoid this failed understanding air planners must ask: what modalities of thought have the potential to create fundamental surprise in the application of airpower?

This study will highlight approaches to planning and cognitive biases that steer air planners to internally focused interpretations of both context and meaning. Planning approaches based on meeting specific threats scenarios or using definitive friendly-force capabilities have the

[1] Zvi Lanir, "Fundamental Surprise – Israeli Lessons," News Online, accessed January 24, 2017, http://adchh.com/fundamental-surprise-israeli-lessons/.

potential to prevent air planners from fully understanding the operational environment, and in particular how the enemy views the friendly force's strength with regards to airpower. Cognitive biases, including anchoring and adjustment bias, mirror-imaging bias, and blind spot bias, create failures in understanding of both context and meaning. These misunderstandings perpetuate a planner's view of reality that is no longer relevant to the enemy. This relevance gap becomes evident when a plan fails and the enemy can negate or avoid the friendly force's assumed advantages in the air. Two compelling examples of fundamental surprise in the application of airpower are the Israeli Air Force's (IAF) experiences in the Yom Kippur War and the Second Lebanon War.

What makes studying the fundamental surprise experienced by the IAF in 1973 and 2006 so compelling? Unique context, challenges with the compression of both space and time, and a range of both conventional and unconventional threats required the IAF to not only approach problems with a unique perspective but to also have an agile force posture to match. The compression of space for Israel occurs from its geopolitical situation. Including Gaza and the West Bank, Israel is approximately the size of Maryland.[2] Israel has a relatively small population and retains minimal natural resources leading to a lack of overall strategic depth.[3] With less than cooperative neighbors along all natural land borders, Israel does not have the luxury to trade space for time and hence faces a continuous and imminent threat to its existence. The compression of time for Israel occurs from the overall pace of conflict the country has faced since independence and the speed at which a seemingly small situation can develop into a sizeable struggle. In nearly seventy years since its independence, Israel has fought no less than seven

[2] Benjamin F. Cooling, ed., *Case Studies in the Achievement of Air Superiority* (Washington, DC: Air Force History & Museums Program, 1994), 565.

[3] John Andreas Olsen, ed., *A History of Air Warfare* (Washington, DC: Potomac Books, 2010), 128.

major wars. The state of Israel has known conflict from its very inception, and due to its geography, demographics, and its surroundings, the IAF has been critical to the defense of the state from the very beginning. This fact was not unknown to early Israeli leaders as expressed by David Ben-Gurion when he said "Our security depends on the air force. If it doesn't command the air, I am doubtful whether we will mobilize our army; I am doubtful whether we will be able to fight."[4] If the IAF stumbles, then it is very likely that the Israeli Defense Force (IDF) will fail. Understanding the weaknesses in the IAF's application of airpower in 1973 and 2006 prompts air planners to look beyond internally focused perspectives and attempt to develop plans that are more relevant to an enemy's understanding of airpower. However, this is not the first time military professionals have studied these conflicts.

The failings in both the Yom Kippur War and the Second Lebanon War have been studied in depth and well documented. Established on 21 Nov 1973, the Agranat Commission investigated decisions made by the military leading up to the conflict, the IDF's general deployment and readiness, and the execution of its operations used to contain the enemy.[5] Of dominant concern to the commission was the lack of warning the IDF had for the impending assault from both Egypt and Syria, and therefore they focused primarily on faulty strategic assumptions and misinterpretations made by the Director of Military Intelligence.[6] Similarly, following the Second Lebanon War, the Winograd Commission became the official inquiry into the IDF actions in 2006. Unlike the Yom Kippur War where Israel had no choice, in the Second Lebanon War, the Israeli political and military leadership decided to use military force on their own accord. The Winograd Commission focused on how a small semi-military force of a few

[4] Olsen, 128.

[5] Bernard Reich, *Arab-Israeli Conflict and Conciliation: A Documentary History* (Westport, CT: Praeger, 1995), 120.

[6] Ibid., 121.

thousand could resist the strongest army in the Middle East, and enable the conflict to end without a clear military victory.[7] While the fight was significantly different as compared to the Yom Kippur War, the conflict in 2006 also ended in what appeared to be a political defeat for Israel.

This study will not contest the issues found in either commission reports or any other publications; instead, this study is an attempt to find other cognitive sources of error in the application of airpower in both scenarios. In fact, in the release of their final report, the Winograd Commission called for "systemic and deep changes in the modalities of thinking and acting of the political and military echelons at their interface, in both routine and emergency [actions], including war."[8] Both the Yom Kippur War and the Second Lebanon War are examples of enemies finding a way to nullify the effectiveness of a highly technical and capable air force. Where the conflict in 1973 represented the ability to use an unforeseen combination of technological systems to counter the IAF's ability to quickly gain air superiority, the contest against Hezbollah proved that an enemy could find low-tech means to mitigate Israeli strengths and reduce the effectiveness of stand-off precision strikes. While previous studies have pored over political missteps, failures in intelligence, and tactical miscalculations this study looks to understand Israel's failings through a more cognitive lens.

To highlight the sources of failed understanding in the application of airpower this monograph will begin with a look at the theory of fundamental surprise. Next, a discussion of threat-based planning and capabilities-based planning will show their tendency to create frameworks that fail in generating relevant questions of meaning. With those approaches in mind, a discussion of cognitive biases will expose the vulnerabilities both of these methods have

[7] "Winograd Commission Final Report," Council on Foreign Relations, accessed November 26, 2016, http://www.cfr.org/israel/winograd-commission-final-report/p15385.

[8] Ibid.

in understanding the context needed to make the application of airpower relevant. A look at the IAF's role in the Six-Day War will demonstrate the foundation of Israel's mindset regarding airpower for the conflicts that followed. Finally, this study will then apply these concepts specifically to the application of airpower in both the 1973 Yom Kippur War and the 2006 Second Lebanon War.

Fundamental Surprise

Fundamental surprise represents a sudden revelation that one's perception of the world is incompatible with reality.[9] Zvi Lanir, a theorist and veteran of the Israeli Directorate of Military Intelligence, developed the concept of fundamental surprise after his experiences with the failures leading up to the Yom Kippur War.[10] Lanir found that "the shock on Yom Kippur was primarily caused by the Israeli's discovery that they misconceived themselves, their military, social, and to some degrees, their moral image."[11] Lanir recognized that efforts focused simply on the methods of achieving surprise, or effects the surprise can have in relation to the different levels of war did not satisfactorily explain the surprise experienced by the Israelis in 1973. Fundamental surprise is generated within the victims of the surprise and stems from a 'relevance gap' that develops in stages as a planner's mindset drifts further from a divergent reality. Dealing with fundamental surprise must go beyond approaches to improve the collecting and processing of information, and must focus on basic thinking errors and a circular process of reframing.[12] To understand the

[9] Sidney Dekker, *Drift into Failure: From Hunting Broken Components to Understanding Complex Systems* (Burlington, VT: Ashgate Publishing, 2011), 89.

[10] Uri Bar-Joseph, *The Watchman Fell Asleep: The Surprise of Yom Kippur and Its Sources* (Albany, NY: SUNY Press, 2012), 5.

[11] Ibid., 5.

[12] Lanir.

sources of fundamental surprise one must first be able to differentiate it from other forms of shock in the battlespace.

Uncertainty is inherent in every combat situation, and this core element of war frequently takes the form of surprise. Technical and doctrinal surprise comprises "the use of weapons and combat doctrine that the victim does not anticipate and cannot obstruct with countermeasures during an engagement."[13] These forms of surprise focus on the methods which an enemy can apply force. Alternatively, strategic and tactical surprise focus on which level of war the surprise is obtained, or which level is affected.[14] Lanir's theory of fundamental surprise does not focus on the mechanization of surprise, or the magnitude of the surprise, but instead focuses on the cognitive source of surprise.[15] Lanir does this by classifying surprises as either situational or fundamental.

Situational surprises are caused by the enemy and are rooted in the failure to gather, process, or distribute information. The span of a situational surprise only covers the revealing event and requires a mode of learning that focuses on improving process, not altering a particular mindset. On the other hand, fundamental surprise originates in the victim, is just the start of a process that expands beyond a singular event, and requires modes of learning focused on reframing the conceptual system used to interpret the world.[16] This system of interpretation is the victim's mindset. Lanir calls the discrepancy between a victim's mindset and reality a relevance gap.

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[13] Meir Finkel, *On Flexibility: Recovery from Technological and Doctrinal Surprise on the Battlefield* (Stanford, CA: Stanford Security Studies, 2011), 29.

[14] Ibid., 23, 29, 223.

[15] Lanir.

[16] Ibid.

Before a fundamental surprise can be realized, a period of time is required to develop a relevance gap. The evolution of a relevance gap can be modeled through four stages: relevance, incubation, denial, and fundamental learning (see Figure 1). In the relevance stage, the victim's mindset still closely matches reality, and only optimization errors exist due to imperfect information processing. The incubation stage begins with a disruptive change that demands a revision of the victim's mindset, but when no such adjustment is made a relevance gap emerges and begins to widen. The denial stage occurs after the event that triggers the fundamental surprise, but initial responses tend to focus on improving processes instead of reframing. Lastly, once a victim recognizes the nature of the surprise and the faulty mindset at its source, fundamental learning can begin. For the military planner, fundamental learning requires a reframing of operational concepts and determining how to gain relevance to the enemy.[17]

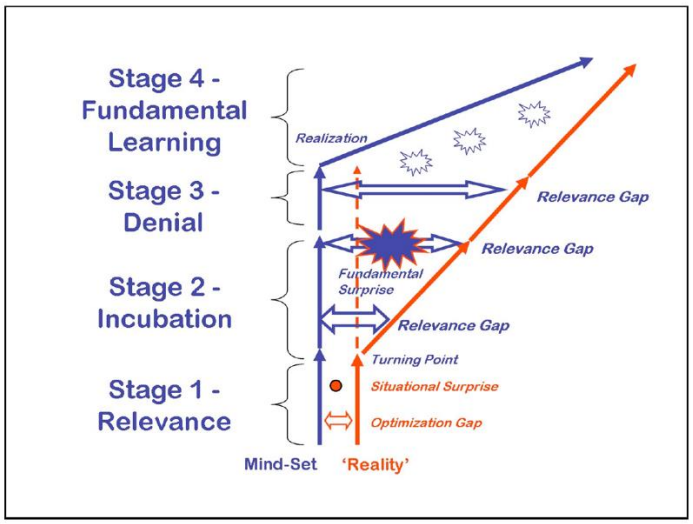

Figure 1. Evolution of Relevance Gaps. Zvi Lanir, "Fundamental Surprise – Israeli Lessons," News Online, accessed January 24, 2017, http://adchh.com/fundamental-surprise-israeli-lessons/.

[17] Lanir.

The concept of reframing a mindset due to fundamental surprise is similar to a concept to explain transformations in scientific research proposed by Thomas Kuhn in his book "The Structure of Scientific Revolutions." Kuhn proposed the idea that the accepted traditions of scientific research within a particular community, known as a paradigm, provide the tools to perform "normal science" problem-solving. When anomalies arise that violate expectations based on the current paradigm, the anomaly turns into a crisis and drives the search for a new set of rules to describe nature.[18] Similar to a paradigm, a mindset that includes a relevance gap requires a crisis to highlight its divergence from reality and force the military planner to develop new tools to gain relevance.

Lanir's personal experience as an intelligence analyst during the Yom Kippur War inspired him to search for a different perspective of surprise. Instead of focusing on the method the enemy uses to achieve surprise or the level of war that is affected, Lanir looked at surprise from the perspective of the victim's mindset. Through this lens, surprise is categorized as either situational or fundamental. Situational surprise occurs when there is a failure in processing information, but a fundamental surprise occurs due to a lack of understanding. Similar to Kuhn's concept of paradigm, a mindset requires external pressure to highlight its faulty logic. While mindsets are neither good or bad, they are unavoidable, quick to form, and resistant to change.[19]

Developing a Faulty Mindset

Planning must make sense of whatever information is available, determine what is relevant, and ascertain what it means to develop an operational framework. The process of making sense is influenced by an individual's mindset; what questions are asked, and how the

[18] Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 3rd ed., (Chicago, IL: University of Chicago Press, 1996), 10, 52, 68-69, 74-76.

[19] Richards J. Heuer, *Psychology of Intelligence Analysis* (Washington, DC: Center for the Study of Intelligence, Central Intelligence Agency, 1999), 111.

answers to those questions are interpreted. Determining what information is relevant and incorporating it into a plan first requires the planner to ask relevant questions. The questions planners ask are based on the approach used to plan. Then information is filtered through cultural, organization and other self-imposed biases.[20] These cognitive biases cloud judgment and often prevent the creation of the most relevant frames required to understand the problem at hand. Anchoring and adjustment and mirror-imaging biases prevent operational planners from seeing how an enemy is likely to counter friendly tactics and capabilities until it is too late. The undetected vulnerabilities generated by not asking questions of meaning and filtering answers through cognitive biases develops a mindset no longer relevant to reality and ultimately vulnerable to fundamental surprise.

Approaches to planning, whether based on specific adversaries or a spectrum of threats, create a framework to form questions about the operational environment. Threat-based planning seeks to create options optimized for specific threat scenarios. These scenarios typically are designed against major theater wars, focus on identifying adversaries, and include details such as warning times and the roles of allies. While useful against specific known enemies, threat-based planning is less applicable versus uncertain threats or situations involving asymmetric force application. On the other hand, capabilities-based planning is designed to function in situations where it is difficult to identify specific adversaries and scenarios. Rather than identifying specific enemies, capabilities-based planning looks to develop and field appropriate counters to a reasonable spectrum of threats. By generating and employing "capabilities" usable for different purposes and different circumstances uncertainty is theoretically reduced.[21] The level of

[20] Scott Plous, *The Psychology of Judgment and Decision Making* (New York, NY: McGraw-Hill, 1993), 13.

[21] US Department of Defense, *Quadrennial Defense Review Report* (Washington, DC, 2006), 4; Lawrence J.Korb, *Reshaping America's Military: Four Alternatives* (New York, NY: Council on Foreign Relations, 2007), 9-10; Stuart Johnson, Martin Libicki, and Gregory F. Treverton, eds., *New Challenges, New Tools for Defense Decisionmaking* (Santa Monica, CA: RAND Corporation, 2003), 60, 141-142.

uncertainty that drives the need to shift between the approaches is heavily reliant on changes to world or regional order.

Geopolitical factors play a major role in determining the amount of uncertainty faced by planners. For example, at the end of the Cold War, the US faced a drastic shift in the world order as the Soviet Union collapsed and the bipolar defense environment shifted to one of ambiguity. Israel faced a similar situation after the signing of a peace treaty with Egypt in 1979, which was a tipping point in the Arab-Israeli War.[22] Before the peace treaty, Israel focused on threat-based planning as evident in the preparations for the Yom Kippur War that focused on specific enemy forces and relied heavily on scenarios including assumed warning timelines. After the peace treaty, the possibility of a massed Arab force threatening Israel melted away. In the Second Lebanon War, the IDF focused on their own capabilities, including stand-off precision attack, more than specific threat scenarios.[23] An important byproduct of the approach used by planners facing a particular problem is the framework for questioning.

A key component in gaining an understanding of the operational environment is asking the right questions. Threat-based planning focuses on identifying the adversary, *who and what*, as well as the scenario, *where, when, and how*. Capabilities-based planning is less concerned with locations, timing, and identifying specific enemies. Capabilities-based planning focuses instead on a reasonable spectrum of threats, *what*, and appropriate counters to those threats, *how*. The critical question that both of these frameworks leave out is *why*. Without asking questions about meaning, the air planner will lack the full context of the situation and will lack the enemy's perspective of airpower.

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[22] Reich, 155, 263; David W. Lesch, *The Arab-Israeli Conflict: A History* (New York, NY: Oxford University Press, 2007), 264.

[23] Eliot A. Cohen and John Gooch, *Military Misfortunes: The Anatomy of Failure in War* (New York, NY: Free Press, 2006), 102; Benjamin S. Lambeth, *Air Operations in Israel's War Against Hezbollah: Learning from Lebanon and Getting It Right in Gaza* (Santa Monica, CA: RAND Corporation, 2011), 136, 283.

In addition to issues with creating relevant frameworks, any answers generated during planning are filtered through cognitive biases. One bias that prevents the development of relevant options is a phenomenon known as anchoring and adjustments. To simplify the task of making judgments about difficult or unfamiliar subjects planners may intuitively or unconsciously develop an anchor to base further analysis. The anchor becomes a natural starting point for sense-making and usually stems from prior analysis or partial calculations. The catch to this phenomenon is that the anchor prevents the planner from making the proper amount of adjustment required to match reality. Even arbitrary or extreme anchors can still have a significant effect on an individual's ability to stray far from the starting point, and often these anchors go completely unnoticed.[24] Anchors prevent planners from fully understanding changes in context by holding their attention on information or assumptions that are no longer relevant to the current situation. Coupled with mirror-imaging an anchor can prevent a planner from using airpower in a manner that leads to the desired end state.

Another very common source of planning bias is mirror-imaging. When faced with a lack of data or a lack of experience dealing in a particular region planners may feel tempted to rely on cognitive tools that they find familiar. In this case the planner assumes, usually subconsciously, the enemy thinks and approaches a problem in a similar fashion. In this vein, the planner applies the limited data on hand through a filter of personal or national experience. By projecting internally held values and conceptual frameworks onto the enemy, it becomes nearly impossible to understand the logic of the situation from the enemy's perspective.[25] This process not only impedes the accuracy of the judgments made on the subject but can also grossly distort the analysis derived through these ill-suited frameworks. The result can be massive oversights in

[24] Heuer, 150; Plous, 146-147, 151.

[25] Lauren Witlin, "Of Note: Mirror-Imaging and Its Dangers," *SAIS Review of International Affairs* 28, no. 1 (2008): 89; Heuer, xxii, 181.

an enemy's understanding of the situation and his capability to resist or counter the application of airpower.[26] The friendly use of airpower has different meaning for the enemy, and mirror-imaging helps mask that meaning from planners. However, even with the knowledge of these cognitive biases air planners are susceptible to their effect due to an individual's inability to detect bias in their own decisions.

One of the reasons these vulnerabilities are so difficult to detect is due to cognitive blindness, otherwise known as bias blind spot. While knowledgeable individuals can readily identify the different biases in the decisions of others, they have a difficult time recognizing biased judgment in themselves. While individuals will often concede that their unique personal experience shapes their views, their asymmetry in perception of bias stems from both naïve realism and their desire to see themselves in a positive light. Naïve realism rests on the tendency that individuals place more faith in their own objectivity than that of others. Bias blind spot is also a particular instance of what is known as the better-than-average effect. This effect enhances a person's positive view of themselves.[27] These factors, when combined, have the tendency to prevent planners from detecting bias and faults in their own thinking. These faults lead to a failure to understand changes in context and a failure to understand meaning from the enemy's perspective.

Understanding context and meaning is critical for an air planner to generate relevant options. A planner's mindset, both the questions asked and the process of interpreting answers, shapes this understanding. Approaches to planning shape the air planner's framework for asking questions. Both threat-based and capabilities-based planning have the potential to be focused on *who, what, where, when, how,* but not *why*. These frameworks limit questions of meaning and

[26] Witlin, 89.

[27] Emily Pronin, Daniel Y. Lin, and Lee Ross, "The Bias Blind Spot: Perceptions of Bias in Self Versus Others," *Personality and Social Psychology Bulletin* 28, no. 3 (2002): 369, 378.

hence limit understanding of context. Further, an air planner's ability to fold the answers to these questions into a relevant approach gets filtered through personal and organizational biases. The lack of questions of meaning and the faults associated with anchoring and mirror-imaging create a mindset vulnerable to a relevance gap. When options generated from this faulty mindset fail unexpectedly, cracks in the planner's perception of reality are exposed, and fundamental surprise begins. For the IAF, the origins of the fundamental surprise they encountered in 1973 and 2006 arose from their overwhelming success during the Six-Day War.

Six Days in 1967: Setting the Standard

On 5 June 1967, the IAF launched a long-prepared operation that helped cement the reputation of the IAF following their successes in the 1956 Sinai Campaign. The surprise deployment of the Egyptian Army across the Suez, and in proximity to the Israeli border, on 14 May triggered Israeli action. At the time the Israeli economy could not sustain a protracted conflict due to the IDF's reliance on reserve mobilization. Israel needed a quick, decisive victory to allow mobilized forces to return to work. Designed as a massive pre-emptive strike, Operation MOKED focused on the enemy's airpower to prevent the launch of any second-strike response. Once Israel achieved air superiority and neutralized the Arab air forces, the IAF planned to shift focus to assisting the Israeli ground forces in achieving their objectives. While MOKED appeared too ambitious for the tiny IAF, its success was critical to the military and political gains Israel achieved during the Six-Day War.[28] The conflict and its overwhelming success shaped the Israeli mindset in regards to the role of airpower in Israel's use of military power.

At the opening of the Six-Day War, the IAF was significantly outnumbered by the Arab air forces regarding aircraft, pilots, and airfields.[29] To counter the significant numerical advantage

[28] Olsen, 129-130, 132; Eliot A. Cohen, *Israel's Best Defense: The First Full Story of the Israeli Air Force* (New York, NY: Crown, 1993), 192-193, 237.

[29] Olsen, 131.

the IAF planned to destroy the Arab aircraft on the ground where they were the most vulnerable.[30] The first wave of IAF sorties attacked Egyptian runways, followed by a systematic destruction of the airplanes that remained on these airfields undefended. The second wave of Israeli air attacks complemented the first by continuing to prosecute Egyptian Air Force (EAF) targets in addition to attacking ground forces. By the third wave of sorties, other Arab air forces started to react, and the IAF shifted some focus to the Syrians, Jordanians, and Iraqis using similar tactics. The Arab air forces did not have an answer to the crushing attack, and by the end of the day, 402 Arab aircraft were destroyed. While this quick strike to gain air superiority was incredibly successful, it also came with a high cost. Through the course of the twelve-hour operation, the IAF lost nine percent of its fighter pilots and thirteen percent of its aircraft inventory.[31] These losses amplified the quantitative disadvantage of the IAF and forced it to find advantages through other means as well.

Another way the IAF countered its underwhelming size in comparison to its enemies was through a significantly large qualitative advantage regarding logistical and maintenance support. By the time the operation was given the green light the IAF inventory was at a ninety-eight percent ready rate. Each aircraft was able to fly four sorties per day which gave air planners an advantage of sortie-per-aircraft rate that the Arab air forces could not match.[32] This surge in sortie production enabled the massing of airpower during MOKED and assisted in preventing the EAF from responding effectively, though they were not completely knocked out in the first twelve hours. It was not until the fifth day of the conflict when the EAF daily sortie count dropped to

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[30] Cohen, 195.

[31] Olsen, 133.

[32] Ibid., 131.

below twenty per day.[33] However, aircraft were not the only threat that the EAF offered as resistance to the Israelis.

The Six-Day War was the first conflict in the Arab-Israeli conflict that saw the use of Surface-to-Air Missile Systems (SAMS). At the time the Egyptian forces ineffectively fielded SA-2 systems that the Soviet Union had provided in very limited quantities. These systems had only marginally challenged the IAF's ability to attain air superiority for two reasons. First, the missiles themselves were crude and not very maneuverable. The IAF crews found that they could evade the missiles. Second, inexperienced Egyptians manned the systems and had trouble engaging low-flying Israeli aircraft.[34] These systems were a new but feeble threat during the Six-Day War. While these systems did not have a significant effect on the IAF's ability to attain air superiority in 1967 their effect six years later was shocking.

The outcome of the Six-Day War and the role airpower played in achieving a decisive victory altered the balance of power in the Middle East. This shift in perceived power shaped not only the Israeli perspective of planning air campaigns but also shaped how the Arabs approached countering this dominant regional force. The catastrophic success of Operation MOKED anchored planners on assumptions that would be politically untenable in future conflicts, and undercut the implications of the technical advancements in Arab air defenses. The reinforcement of preemption and the primacy of aircraft in achieving air superiority prevented the Israelis from recognizing the changes in context that developed in the years leading up to the Yom Kippur War. While no one questioned the qualitative advantage the IAF held over its enemies, Israel's expectation of dominance from the air strengthened a mindset that ultimately led to fundamental surprises in both 1973 and the 2006 conflict against Hezbollah.

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[33] Olsen, 134.

[34] Finkel, 164; Cohen, 208; Lon C. Nordeen, and David Nicolle, *Phoenix over the Nile: A History of Egyptian Airpower, 1932-1994* (Washington DC: Smithsonian Institution Press, 1996), 249.

Yom Kippur War: Air Superiority Redefined

On the afternoon of 6 October 1973, the IAF was preparing to respond to full blown offensive actions by both Syria and Egypt. Six years after the Six-Day War the primary enemies and terrain remained the same, but the air war over the Sinai and Golan Heights would play out significantly different in this round. The overwhelming success achieved by the IDF in 1967 as well as the War of Attrition shaped not only the Israeli approach but also those of the Egyptian and Syrian forces. Whereas the Six-Day War represented a classic hammer strike directed at the air forces of the enemy as envisioned by early airpower theorists such as Guilio Douhet, the Yom Kippur War demonstrated the effects of a drawn-out attempt at achieving air superiority. The failures of the Israeli approach in 1973 stemmed from a faulty mindset that prevented the IAF from generating relevant options for achieving strategic objectives. Anchored on the successes of 1967 and a flawed understanding of Egypt's strategy, the Israelis failed to identify key changes in strategic context. Additionally, with a self-reflexive view of air superiority, the IAF failed to understand how their enemies understood control of the air. These factors, when combined, led to the fundamental surprise experienced by the IAF on the first day of the war. The disruptive change that started this path towards lack of relevance occurred during the War of Attrition.

With the Egyptian front erupting within weeks of the Six-Day War and lasting until the ceasefire negotiated in the summer of 1970, the War of Attrition was one of the longest and most difficult conflicts in Israel's history. During the War of Attrition, the IAF was able to quickly isolate and destroy the Egyptian army's primary defensive missile batteries, the SA-2 Guideline, along the Egyptian front. These "Boxer" operations and multiple uncontested runs of Israeli combat aircraft directly over Cairo proved to the Egyptians that their current method of defense was inadequate. In addition to receiving newer systems from the Soviets that accounted for earlier gaps in coverage, the Egyptians also began to overlay these missile batteries with low-altitude anti-aircraft artillery that reduced the network's vulnerability to Israeli tactics. These

escalations culminated in operations during July 1970 where the Israelis lost five F-4s to Egyptian missiles just before the implementation of a negotiated cease-fire.[35] What Israel did not know at the time was that the cease-fire enabled the Egyptian Air Defense Force to move and reinforce its air defense network, to include the new and highly capable SA-6, along the Suez. This shield now extended well into the Sinai Peninsula and posed a significant threat to IAF operations along the southern front.

The War of Attrition took a heavy toll on both the Israeli and Egyptian militaries. While the IAF achieved a glimpse at the potential threat the Egyptian air defenses posed, the Israelis did not walk away from the conflict with any clear lessons. It appeared that the IDF was still undefeated and that the IAF was the only arm that had enough speed, strength, and reach to postpone or thwart a surprise attack.[36] While the IAF made attempts to create technological responses to the new missile systems, there was a general sense that the next war was on the distant horizon.

In preparation for the coming war, the Egyptians and Syrians designed the largest, densest, most modern, and most integrated air defense network the IAF had seen to date.[37] The Egyptians had an impressive umbrella of air defense systems with a total of 880 SAMS, of which eighty were the advanced and mobile SA-6. For aircraft, the Egyptians outnumbered the Israelis three-to-one. Even with this significant quantitative advantage, the EAF knew how capable their enemy was, and had no intention of facing off in a conventional air war. Whenever possible, the EAF planned to avoid contact with the IAF, and only engage IDF ground troops when the likelihood of intervention was low. Israel's northern front represented some similarities, but also

[35] Cohen, 322; Cooling, 585.

[36] Cohen, 316.

[37] Cooling, 586.

key differences. The Syrian's air defense network was smaller and less complete compared to the Egyptians, but still contained 360 SAMS, sixty of which were of the SA-6 variant. Because the air defense umbrella was not as robust as the Egyptians, the Syrian pilots could not afford to be as cautious in engaging the IAF if they hoped to prevail.[38] For this reason, the Syrian Air Force was much more likely to engage the Israeli fighters compared to their Egyptian counterparts.

In the two years before the outbreak of the Yom Kippur War, the IAF invested a tremendous amount of effort developing plans to destroy both the Egyptian and Syrian air defense systems at the opening stages of the next conflict. It was clear that the IAF appreciated the missile threat, but the success of their plans rested on both warning and preemption. Israeli intelligence officials assumed that they would receive intelligence that would give them at a minimum a forty-eight-hour notice to enable both ground force mobilization and a preemptive air campaign. The preemptive strikes would rely on clever and sophisticated attacks incorporating the use of electronic intelligence to determine the location of radars, new electronic warfare equipment to thwart these radars, and anti-radiation missiles to destroy them.[39] Ultimately the assumptions that enabled the carefully developed plans fell through. The IAF did not get a two-day warning before the Arab assault, and when they were alerted they were unable to execute even a limited preemptive strike. The IAF had overestimated their ability to handle the missile threat, and it drastically affected their attempt to gain air superiority.[40]

At 0500 hours on the morning of the 6 October the commander-in-chief of the IAF, Benny Peled, received intelligence that the Egyptians and Syrians were going to begin a major offensive that afternoon. Peled's immediate response was to begin planning a preemptive strike

[38] Cooling, 587-588.

[39] Cohen, 351; Cooling, 588; Cohen and Gooch, 102.

[40] Cooling, 588.

on Syria that supported the already developed "Scratch Plan" for the Egyptian front. These preemptive strikes were focused on enemy SAMS and would enable the IAF to have freedom of maneuver to stop the expected armored assaults across the Golan Heights and Sinai as the IDF mobilized its reserve forces. While this course of action had the potential to give the IAF a significant advantage in the pending conflict, politically Israel could not be the aggressor in this round. Israeli Prime Minister Golda Meir objected to any preemptive strike and only allowed the IAF to enter into a state of heightened alert.[41] All the IDF could expect to do was absorb the initial offensive actions of Egypt and Syria with a hope to quickly transition and gain the initiative themselves. As the IAF responded at the start of the war, it became apparent that their mindset with regards to airpower lacked relevance.

At the opening of the conflict, Israel found its application of airpower ineffective, and its fundamental surprise was complete. On the first day, the IAF became increasingly dispersed across both the Syrian border and within the Sinai as they responded to desperate cries for help from Israeli ground forces.[42] Without enough aircraft to mass an overwhelming force against the enemy air defense systems the IAF attempts were easily thwarted. One of these attempts, Operation DUGMAN 5, was flown on 7 October and focused on the Syria air defense systems supporting the offensive in the Golan Heights. With only three of thirty-one air defense batteries identified beforehand, the IAF aircraft were at a significant disadvantage. Of the twelve F-4 Phantoms launched on the mission, only six would return home with insignificant effects achieved against the Syrian batteries. This shocking reversal of fortunes compared to the Six-Day War paralyzed the IAF in their initial efforts of the conflict.[43]

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[41] Cohen, 322, 324.

[42] Ibid., 352.

[43] Cohen, 353.

Unlike the Six-Day War, the IAF could not help Israel achieve a swift decision in 1973. Having particular difficulties on the southern front with Egypt's air defenses, the IAF could not achieve air superiority over the entire region for two weeks. The tide along the northern front in the Golan Heights began to turn on 8 October. The Syrians ran out of missiles forty-eight hours into the conflict leaving the missile batteries silent as they waited for Soviet resupply. This opportunity allowed the IAF to fly interdiction missions against Syrian airfields, armor units, and missile batteries with minimal resistance. The denser Egyptian network of missile batteries took much longer. It was not until 22 October, sixteen days after the beginning of the conflict, that the IAF could fly over the entirety of the Sinai, Suez, and Egypt proper with minimal interference from SAMS.[44] By the conclusion of the war, it was clear that the expectations for airpower had far exceeded the actualized results.

When both sides agreed to the cease-fire, the IDF had regained all of the Golan Heights, recovered almost all of the Sinai Peninsula, established air superiority over the region as a whole, and their land forces even threatened both Cairo and Damascus.[45] However, for the IAF this was only part of the story. The IAF lost 114 aircraft during the conflict, of which SAMS or anti-aircraft artillery accounted for 109. The IAF lost eighteen percent of its total strength as compared to twelve percent lost during 1967. During this time the IAF destroyed forty-three Egyptian Air Defense Force missile batteries and eight Syrian missile batteries. IDF armor and artillery units destroyed an additional eleven missile batteries. On the other side, the Egyptian and Syrian forces lost 450 aircraft in the conflict. Of these losses, 277 came from air-to-air combat, compared to only six IAF aircraft shot down in the same manner. Here the emphasis for the IAF on superiority over enemy aircraft is clear.[46] Without enough emphasis on enemy missile systems, the IAF could

[44] Olsen, 145; Cooling, 590-592; Cohen, 360, 368.

[45] Lesch, 249-250; Olsen, 135.

[46] Olsen, 135; Cohen, 367-368, 390-391.

not effectively use airpower to support the IDF's overall mission during the initial stage of the war. Even though the IAF prevented any targets deep within Israeli from being attacked from the air, and the IDF held off both the Egyptian and Syrian advances due to IAF support, the war shattered the Israeli mindset.

The cognitive trauma caused by the IAF's initial setbacks during the Yom Kippur War can be viewed through Lanir's concept of fundamental surprise. These setbacks were immediately scrutinized by the Agranat Commission once hostilities ended. The commission had the task of assigning blame for the failures of the war, but it focused on intelligence processes and enemy methods of creating surprise instead of the disconnect between the Israeli mindset and the contextual reality of the conflict.[47] Looking at this disconnect rather than errors in execution can provide another lens in understanding the IAF's inability to generate relevant options in the early stages of the war.

The IAF's relevance gap evolved through the stages outlined by Lanir, and began with fundamental changes to the Arab perspective of air power. The qualitative advantages held by the Israelis throughout the Six-Day War and War of Attrition forced the Egyptians and Syrians to alter how and why they fought. The introduction of the SA-6 and integration of overlapping air defense systems required the IAF to reframe their approach to defending Israel. When this reframing did not occur, the Israelis left the relevance stage and entered the incubation stage. The events of 6 October, and the inability for the IAF to have any meaningful effect on the air defense systems along both the northern and southern fronts represented the start of the denial stage. Even once it was evident that their understanding of the operational environment was radically flawed, the Israeli high command failed to act in a comprehensive manner against the missiles, but

[47] "Agranat Commission of Inquiry Interim Report," Center for Israel Education, accessed November 26, 2016, https://israeled.org/wp-content/uploads/2015/06/1974.4-Agranat-Commission-of-Inquiry-Interim-Report.pdf, 3; Cohen and Gooch, 112.

instead chose to gnaw along the defense's periphery.[48] It was not until 18 October that the IAF began the fundamental learning stage. During this period, the IAF initiated a series of defense suppression raids along the Suez Canal in conjunction with ground forces, using a combination of bombs, artillery fire, electronic countermeasures, and anti-radiation missiles.[49] These raids turned the tide along the southern front, but it was too late. Israel's flawed mindset gave Egypt the time it needed to counter the narrative of IDF invulnerability, and drastically shifted the nature of the Arab-Israeli conflict.

The Israelis were unable to generate relevant options for the application of airpower during the Yom Kippur War due to a faulty framework for questioning, anchor points, and mirror-imaging. First, from a threat-based perspective, the IAF failed to ask questions of meaning. The Israelis did not understand *why* Egypt would start a war it could not win, and did not appreciate the Arab perspective of achieving air superiority. Additionally, in the period leading up to the Arab assault the Israelis based their plans, and their application of airpower, on two main anchors regarding Arab intentions and desired IDF operational forms. Finally, the Israelis used mirror-imaging to understand the Arabs' approach to air superiority when in reality both the Egyptians and Syrians had made significant changes due to their experiences in 1967. All of these factors enabled the development of a flawed Israeli mindset with regards to airpower at the opening of the 1973 conflict. The foundation of this mindset, and primary anchor, was based on Egypt's motives for the war.

The Agranat Commission labeled the first anchor as "The Concept." This concept assumed Egypt would not attack without the capability to strike deep within Israeli, and Syria would not strike without Egypt. What made this particular anchor so strong was that it was

[48] Cohen, 368.

[49] Lon Nordeen, *Fighters Over Israel: The Story of the Israeli Air Force from the War of Independence to the Bekaa Valley* (New York, NY: Orion Books, 1990), 141.

Egypt's actual strategy that reputable sources leaked to Israel. In fact, Anwar Sadat dismissed his minister of defense in late 1972 for refusing to violate its terms. What this concept did not take into account were the cumulative changes that occurred in both the Egyptian and Syrian forces since the Six-Day War. The slow, incremental, but evolutionary changes to the enemy forces, and their means to nullify the IAF were overlooked, and appropriate adjustments to Israeli strategy were missing.[50]

The second anchor that prevented the IAF from fully understanding the conflict in 1973 was the catastrophic success the force had enjoyed six years earlier. The debilitating nature of Operation MOKED on Israel's enemies cemented the role of the IAF in any future conflict for Israel. After the Six-Day War, the Israeli command felt that the IAF had enough power and efficacy to provide air defense, tactical support to troops, support for the navy, provide strategic attack, all while making up for shortages in ground-based artillery.[51] What the IAF did not take into account was that MOKED relied on a preemptive attack on its enemies. The IAF should have realized that the increased dependence on the US since the last war meant that a preemptive strike would be politically untenable.[52] The carefully laid plan developed by the IAF to knock out the Egyptian and Syrian air defenses and air forces preemptively, then shifting to support the ground operations was fatally flawed. This plan not only did not take into account the political changes afoot but also failed to account for the drastically different military solutions both Egypt and Syria developed after 1967. This last failure was due to a mirror imaging bias deeply rooted in the IAF's understanding of air superiority.

[50] Cohen and Gooch, 114, 116, 130.

[51] Central Intelligence Agency, *The 1973 Arab-Israeli War: Overview and Analysis of the Conflict* (Washington DC, Sept 1975), 26.

[52] Cohen and Gooch, 122.

Even as an unexpected attack loomed on the horizon for Israel, on the morning of 6 October, a former IAF commander expressed his disbelief that a war could start by exclaiming, "The Egyptians don't have an air force!"[53] This perception that the Egyptians, and hence the Syrians, could not possibly initiate a conflict without a properly prepared air arm demonstrates the mirror-imaging at play with the Israeli understanding of how to achieve air superiority. Similar to Douhet's concept, Dan Tolkowsky, who served as the IAF commander from 1953-1958, saw the most important use of the IAF was to destroy as much of the enemy's air force as possible to achieve air superiority. This concept was reinforced by the overwhelming success of Operation MOKED during the Six-Day War. Plans that were developed for the next conflict closely matched those executed in 1967, but with added emphasis on the new missile systems. While the IAF appreciated the threat posed by the newer missile systems, their emphasis on preemptive strikes allowed them to overestimate their ability against an air defense network that was now four times larger than the one they faced in 1967.[54] While expecting Egypt and Syria to fight for air superiority in a similar manner to Operation MOKED, the IAF failed to see how their enemy understood the same fight.

By the end of the conflict, the IAF had recovered and played a significant role in protecting the nation from air strikes and stopping the threat posed by the Syrian Army on the northern front. The impact of the Operation MOKED and the dominance of the IAF over Egyptian SA-2's during the War of Attrition cannot be understated. The Six-Day War and the years that followed helped to reinforce the IAF's understanding of airpower and its role in attaining air superiority, but their understanding was divergent from their Arab enemies. The IAF became anchored on assumptions about pre-emption as a means to neutralize the Egyptian and

[53] Cohen and Gooch, 115.

[54] Nordeen, 29, 56; Cooling, 566, 588; Cohen, 313.

Syrian air forces, but these ideas were both politically and technologically irrelevant at the start of the conflict. The Israelis planned against a well-known and specific existential threat, however, this did not prevent a failure in understanding due to a failed framework for questioning and cognitive bias. Ultimately, the IAF failed to realize that both the Egyptians and Syrians had redefined air superiority in the Yom Kippur War until the fight for control of the air was already underway.

Second Lebanon War: Perceptions Matter

In 2006, six years after withdrawing from Southern Lebanon, the IDF was required to counter the threat posed by Hezbollah to the north. Unlike the campaign that began the occupation in 1982, this time the IAF faced a vastly different operational environment and strategic objectives. The IAF itself was also vastly different. The IAF after 1979 shifted their focus to a capabilities-based approach to applying military power, with a focus on precision stand-off firepower.[55] The Second Lebanon War began as an aggressive response to a kidnapping of IDF personnel and developed into a major thirty-four-day conflict that many view as a strategic failure for the state of Israel. While many view the failures as a sharp rebuke to the application of precision stand-off firepower as a central means to conflict resolution, there were underlying vulnerabilities in Israeli's understanding of how the application of airpower could have forced Hezbollah to capitulate.[56] An approach focused on capabilities developed a framework of questioning that did not uncover the full context of the situation. Also, both anchoring and mirror-imaging bias nurtured a relevance gap between how the IAF saw the applicability of airpower in the Second Lebanon War and the actual effects their approach could

[55] Lambeth, 136, 283.

[56] Ibid., xvi.

achieve. The resulting fundamental surprise prevented the IAF from using airpower in a manner capable of attaining its strategic goals.

The enemy that Israel faced in the Second Lebanon War was different in nature to previous enemies in this region. Hezbollah was founded by Iran in 1982 following the Israeli invasion during Operation Peace for Galilee. While heavily funded by the Shiite government of Iran, Hezbollah was a movement that stemmed from the same forces that drove the political involvement of the Lebanese Shiite population in the latter half of the twentieth century. Unlike its predecessors, Hezbollah became a fundamental part of Lebanese politics by not only representing large portions of the Shiite population in parliament by 1992 but also having representation among the Lebanese ministers by 2005. The hybrid nature of Hezbollah and their ability to blur the lines between civil and military institutions was a crucial factor in the problem they posed at the beginning of the conflict. The consolidation of power that firmly planted Hezbollah into the fabric of the Lebanese security environment began with the Israeli withdrawal from the eighteen-year occupation that followed Peace for Galilee.[57]

As soon as the IDF left the security zone in southern Lebanon in 2000, Hezbollah began to shape the region south of the Litani River for the purpose of countering Israeli strengths in a future conflict. Hezbollah saw the Israeli population as a critical vulnerability. Hezbollah's method to attack this weakness was through their ability to rain down rockets into Israeli territory. Not only did Hezbollah's rocket operation have to reach deep into Israeli territory, but it also had to be able to withstand the massive precision standoff firepower from both air and land systems employed by the Israelis. To extend their reach, Hezbollah established multiple units anchored around the Litani River. South of the river they established a unit that controlled all the 122mm Katyushas, both north and south of the river they positioned units controlling medium and long

[57] Olsen, 299; Lambeth, 213; Matt M. Matthews, *We Were Caught Unprepared: The 2006 Hezbollah-Israeli War* (Fort Leavenworth, KS: Combat Studies Institute Press, 2008), 10-11.

range missiles. By 2006, with support from Iran and Syria, Hezbollah had massed between 12,000 to 13,000 missiles and dispersed them throughout villages and open areas to mitigate the effectiveness of Israeli precision munitions. Also, Hezbollah had remotely piloted aircraft, anti-ship missile units, and around 10,000 ground forces armed with advanced anti-tank missiles. All of these capabilities were fully integrated both to protect rockets units and to delay IDF ground movements south of the Litani River. According to an IAF campaign planning officer Ron Tira, "Hezbollah's brilliant trap apparently left Israel with two undesirable options." Israel could choose to avoid ground operations through the use of airpower while exposing its home front to rocket attacks, or it could wage a costly ground offensive that would generate a loss of soldiers through ongoing ground-based attrition with entrenched guerrilla formations.[58]

On 12 July 2006, an IDF patrol was ambushed by Hezbollah fighters along the border of Israel and Lebanon. During the engagement, Hezbollah fighters dragged two injured soldiers from their vehicles and moved them across the border into Lebanon. Confusion delayed the IDF's kidnapping response procedures by over thirty minutes. The response was also slow due to concern for mines and improvised explosive devices in the area.[59] The abrupt and confusing incident was the beginning of the Second Lebanon War under an operation called Change of Direction.

What started out as an aggressive response to a security incident along the border, developed into a much larger struggle. There was an apparent disconnect between policy objectives coming from the civilian government and goals being set by the military establishment. The clearest position that Prime Minister Ehud Olmert forwarded was in the form of a speech on 17 July. He stated that Israel's goals were to secure the return of the kidnapped soldiers, to drive

[58] Matthews, 16-18, 21-22; Olsen, 302; David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: RAND Corporation, 2011), 9.

[59] Matthews, 33-36.

Hezbollah out of southern Lebanon, and facilitate the deployment of the Lebanese Army in the southern security zone as outlined by a UN Security Council resolution. These highly ambitious goals stood in stark contrast to the rather ambiguous objective set forth by the IDF. According to the IDF, the objective of Operation Change of Direction was to restore and increase Israel's deterrence to Hezbollah.[60] While not entirely disconnected, these two very different goals developed drastically different lenses with which to view the application of airpower against Hezbollah in Lebanon.

The IDF Chief of Staff, Dan Halutz, suggested a widespread air campaign that was designed to place pressure on Lebanon to deal with Hezbollah, and at the same time attack the idea of Hezbollah as a capable "Shield of Lebanon." Due to pressure from the US to keep the current leadership in Lebanon in power, and the devastating effect the large-scale attacks on Lebanese infrastructure would have on the regime, this concept was a non-starter. The order issued to the IDF on 12 July directed the destruction of Hezbollah's long-range rockets, the damage of rocket launch sites, and attacks against the militia's soldiers, command and control, and symbols of power. Also, the IDF was to establish a security zone along the border with Israel and establish an aerial and naval blockade of Lebanon to prevent military resupply from Iran and Syria.[61] Ultimately the campaign evolved through three distinct phases, and the IAF played the largest part in its execution.

While the operations were not developed officially around three phases, these delineations evolved naturally out of the changing operational and political environment. The opening phase from 12 to 19 July revolved around the initial response to the kidnapping and the attempt to neutralize Hezbollah's strategic capabilities. The IAF air strikes focused on preventing

[60] Olsen, 304.

[61] Ibid., 305, 309.

Hezbollah's movement of the kidnapped soldiers, their medium and long-range rocket launchers, and other strategic assets and symbols of power. The second phase, 20 to 31 July, is identified by the increased attempt to hunt for and destroy short-range rockets and their associated systems in southern Lebanon. On 30 July, a building that was struck by an IAF air strike collapsed in the village of Qana and killed twenty-eight civilians. This incident began to shift the tide in international opinion on the operation in Lebanon. Europe pulled their public support, and the consensus within Lebanon against the operation solidified. After the incident in Qana, Israel adopted a unilateral ceasefire to ease international concern, but this also allowed Hezbollah to reorganize their rocket deployment.[62]

The third and final phase of the operation started with an expansion of ground operations to create a six-kilometer security zone along the border and the resumption of air strikes on 2 August. On 9 August, the IDF received authorization to conduct a major ground operation into southern Lebanon which commenced two days later.[63] One day after the major ground operation began, the UN Security Council adopted a resolution which called for an end to the conflict and the dispatch of a UN security force to the region. The resolution was accepted by Israel the following day, and the cease-fire was implemented on 14 August, only three days into the IDF's ground campaign.[64] As such, Operation Change of Direction ended as quickly as it began, and Israel found itself without achieving a clear victory.

Itai Brun describes the Second Lebanon War as a missed opportunity, "not because of the number of Israeli losses, but rather because of the wide gap between expectations at the beginning of the war and its final outcomes."[65] Lanir's fundamental surprise provides an additional lens with

[62] Olsen, 309, 311.

[63] Ibid., 312-313.

[64] Olsen, 314; Matthews, 51-52.

[65] Olsen, 297.

which the some of the failures of this air campaign can be viewed. Previous studies have primarily concentrated on political missteps, misapplication of capabilities, and execution errors, and focused less on the development of the Israeli mindset entering the war. Looking at the factors that shaped how the IAF interpreted events as they were unfolding can give a different insight into why the application of air power at the opening of the conflict failed to make the connection between tactical actions and the nation's strategic goals.

The evolution of Israel's relevance gap that led to the fundamental surprise in the 2006 conflict started with the IDF withdrawal from Lebanon six years prior, and did not finish until after the war ended. As soon as Israeli forces left southern Lebanon in 2000, Hezbollah began to build their network of tunnels, fighting positions, and rocket sites south of the Litani River. These preparations were and attempt to counter the anticipated use of stand-off precision strikes, and required a mindset change on the part of Israeli air planners.[66] This began the incubation stage, and carried through the planning and initial execution of the Second Lebanon War. By 14 July, the initial Israeli approach began to show diminishing returns, and it became evident that the IDF was no closer to securing the release of the kidnapped soldiers or slowing the small rockets attacks.[67] Here Israelis entered the denial stage where they would remain until after the conflict ended. It wasn't until the conflict in Gaza in 2008 that the IDF entered the fundamental learning stage and developed a relevant counterstrategy to the small rocket threat posed by its neighbors.[68]

The factors that prevented the Israelis from adjusting their mindset entering the Second Lebanon War stemmed from their questioning framework as well as inherent cognitive bias in their interpretation of the operational environment. Using an approach that focused on capabilities, specifically stand-off precision strikes, the IDF focused on *how* they could compel

[66] Johnson, 45; Matthews, 17.

[67] Matthews, 38-39.

[68] Lambeth, 342n, 277-278.

Hezbollah and the Lebanese government, and not the meaning behind these operations. Additionally, both anchoring and adjustment bias and mirror-imaging bias led to a failure to understand changes in context and the failure to understand the strengths and weaknesses of Hezbollah as a military, political, and social organization. The subsequent fundamental surprise, and inability to quickly adjust course guided a conflict that appeared to be at odds with Israel's overwhelming superior military power and counter to recent applications of airpower.

Examples of how airpower could contribute to the achievement of Israel's objectives and the memories of previous operations in Lebanon presented multiple anchors that affected air planners' abilities to generate relevant options for the IAF. Successes from US air operations in Iraq in 1991 and 2003, as well as in Kosovo in 1999, gave the Israeli leadership hope that it could achieve its objectives against Hezbollah by directly targeting leadership and key infrastructure.[69] Additionally, in light of these American successes and improvements in technology Israeli hoped to the avoid being entrapped in another occupation in the Lebanese "mud." They emphasized options focused on firepower versus maneuver and control of territory. Airpower had not lost its efficacy, but its application did not account for the differences in time, financial and diplomatic constraints, or the fact that Israeli civilians were under attack. The options selected were not translated properly from the planning anchors, and when applied were not fully relevant to the Lebanese battlefield.[70] Israeli air planners not only failed to understand changes in context but also made crucial misjudgments of the organization they were fighting.

The first misjudgment was Israel's inability to both identify and confront the importance of the short-range Katyusha rockets for Hezbollah's overarching strategy. This error is evident in the fact that in the opening phase of the conflict the IAF was specifically tasked with the

[69] Lambeth, 210; Olsen, 306; Johnson, 31.

[70] Lambeth, 210, 281, 316.

destruction of medium and long range systems, but not the elimination of the short-range rockets.[71] One possible explanation for this is potential mirror-imaging by Israeli planners. By emphasizing systems with the most capability to reach deep into Israeli territory, planners missed the systems that had the most capacity to impact Israeli citizens living in the north. Another factor is a potential emphasis on Israeli capability versus the impacts of these actions through Hezbollah's understanding. Through the use of precision attacks Israel was confident it could hit any target it could find in Lebanon. While possibly not being able to affect the short-range rockets, they could hurt Hezbollah in a way that could still bring Israel military and political success.[72] Israel failed to understand that Hezbollah was not trying to cause the most destruction, but rather cause the most fear and uncertainty, thus highlighting the limitations of the IDF.

The Israelis also misjudged how their actions were going to be perceived by the outside world, and how this affected their ability to achieve their strategic goals. Of particular issue, as is to be expected with belligerents shielding themselves within population centers, was that of civilian casualties. The IAF and their aircrew were highly sensitive to noncombatant immunity, and this was evident in not only their restraint in the air but also in the systematic and orderly process used to verify and clear potential targets. In addition to having lawyers comb over each part of the process the IAF also attempted to warn civilians near future strikes using telephone calls, radio and television broadcasts, and show-of-presence passes to minimize the number of civilians in harm's way. The IAF was aware that Hezbollah would use any image of civilian casualties, legitimate or otherwise, to foster discontent with the Israeli actions. However, explaining the process as legitimate through the lens of military necessity and international law fell on deaf ears. Jan Egeland, the UN's Humanitarian chief, stated before the end of the conflict,

[71] Olsen, 306.

[72] Lambeth, 201.

"there is something fundamentally wrong with a war where there are more dead children than armed men. It has to stop."[73] In this case, the IAF may have needed to be even more stringent in discriminating dual use targets for air strikes. Through mirror-imaging, Israel failed to understand the meaning of the application of just war principles in a conflict involving a powerful military state against a highly-integrated hybrid organization. While precision strikes were able to destroy the targets on the ground, the effects of the strikes were not fully relevant to Israel's strategic goals.

The lack of understanding of Hezbollah's strength in their capability to threaten Israel and their use of Israel's strikes as propaganda created a relevance gap that led to fundamental surprise. The event that triggered Israel's recognition of the gap in their understanding of the strategic reality of the situation was the ceasefire called after the collapse of a building in the village of Qana. Two things became fatefully obvious after this event. First, the outcry from the rest of the world made it painfully evident that the outside world was perceiving Israel's action differently than expected. Second, it became clear that Hezbollah, despite the intense air campaign, was still firing just as many rockets into northern Israel as when the conflict began. Not only was Hezbollah undeterred by Israel's actions and the Lebanese government was unwilling to intervene, but the attempts to reduce these capabilities from the air had been unsuccessful. At this point the IDF had no choice but to drastically alter their approach to handle the real problem at hand, stopping the short-range rockets, and initialize a much larger ground operation.[74] Because it had taken so long for the IDF to recognize this relevance gap and adjust, by the time the ground offensive started the international community had already stepped in and prevented the IDF from accomplishing their strategic ends.

[73] Lambeth, 159-160, 164.

[74] Lambeth, 167, 173-174; Matthews, 39.

The Second Lebanon War ended as abruptly as is it started. The Israeli air campaign failed to accomplish Prime Minister Olmert's goals of driving Hezbollah out of southern Lebanon and facilitating the return of the Lebanese Army along the border. The conflict began as a response to the kidnapping of IDF soldiers by Hezbollah fighters and quickly expanded into a major campaign aimed at a hybrid and highly integrated organization. The approach that evolved over three distinct phases was focused on using precision stand-off attacks but failed to counter Hezbollah's main strategic capability: the ability to threaten the Israeli population with short-range rocket fire. The precision stand-off capability of the IAF did not generate relevant options due to a failure to understand changes in context and a failure to understand meaning enabled by both anchoring and mirror-imaging biases. The IAF approach to planning based on capabilities still presented vulnerabilities through these cognitive biases, and ultimately led to fundamental surprise.

Conclusion

This paper explored the concept of fundamental surprise in the application of airpower. First, the focus of this study was the theory behind Zvi Lanir's idea of fundamental surprise and how it differs from other forms of shock in the battlespace. Next, the discussion turned to ways an air planner's mindset can be misguided by not asking relevant questions about meaning and then filtering the answers through cognitive biases. This process can develop a faulty picture of reality, and when plans unexpectedly fail, the resulting fundamental surprise drives the need to reframe. Additionally, this paper looked at two case studies of the IAF that highlighted these vulnerabilities in both the Yom Kippur War and the Second Lebanon War.

Shifts in global or regional order may require a nation to shift from a threat-based planning approach to a capabilities-based approach. While threat-based planning has strengths against specific known threats, a capabilities-based approach is stronger versus ambiguous and

asymmetric enemies.[75] The U.S faced this type of change at the end of the Cold War with the fall of the Soviet Union, and it is arguable that Israel faced a similar shift in regional order with the signing of the Egypt-Israel Treaty in 1979. Both threat-based and capabilities-based planning can produce frameworks for inquiry that leave out the most important question: *why*? Without asking questions of meaning, planners cannot develop a mindset relevant to the enemy.

Regardless of the approach used, planning the application of airpower requires making decisions that are vulnerable to cognitive bias. Two of the biases applicable to this study are anchoring and adjustment bias and mirror-imaging bias. An anchor is a natural starting point for sense-making based on prior analysis or partial calculations and prevents planners from making a large enough adjustment to create a perspective matched to reality.[76] In the case of mirror-imaging, the planner assumes the enemy approaches a problem in a similar fashion and makes it difficult to understand the logic of the situation from the enemy's perspective. Cognitive blindness amplifies the effects of these biases by making it difficult for planners to detect these faults in themselves.[77] Without the recognition that their manner of thinking is flawed, planners develop a relevance gap where their mindset no longer represents reality from the enemy's perspective. This break from reality goes unnoticed until the planner experiences fundamental surprise; an event that shatters this faulty perception of reality.

The IAF suffered from fundamental surprise in both the Yom Kippur War and the Second Lebanon War. The Six-Day War in 1967, and in particular Operation MOKED, had set the standard for how the IAF could leverage airpower to achieve success. In 1973 Israel still faced the potential of an Arab coalition on both their northern and southern borders, and planned to

[75] Stuart, Libicki, Treverton, 142.

[76] Heuer, 150.

[77] Witlin, 89; Heuer, xxii; Pronin, Lin, Ross, 369.

counter this specific known threat. With the threat of the Arab coalition gone after the treaty with Egypt, the IAF could focus operations based on precision stand-off attacks to counter the guerrilla warfare tactics posed by groups such as Hezbollah.[78] Although the IAF used different approaches in the application of airpower for both conflicts, both approaches were vulnerable to anchoring and mirror-imaging biases. During the Yom Kippur War, this created a relevance gap that required the IAF to use preemption, which was no longer politically feasible, and did not fully account for how the Arabs understood air superiority through missile defense. In the Second Lebanon War, cognitive bias prevented the IAF from translating examples of successful US air campaigns into an approach meaningful to counter Hezbollah. These failures gained Israel's enemies both time and strategic leverage, and prevented Israel from attaining clear, decisive victories.

While not prescriptive in nature, this study offers an additional lens with which to view the IAF shortcomings in both 1973 and 2006. However, even with detailed knowledge of how cognitive biases may affect air planners, bias blind spot makes detecting and avoiding these mistakes difficult. On the other hand, a properly developed framework for questioning has the potential to expose how the enemy understands airpower. This suggests the potential for further study of fundamental surprise in the application of airpower. Research into developing questions of meaning may assist air planners in recognizing drastic changes that require a reframe, reversing the evolution of a relevance gap, and in forming relevant operational approaches.

An air planner is vulnerable to generating options that are not relevant to the enemy due to failures in understanding context and meaning. It is imperative to gain an understanding of friendly strengths and capabilities from the enemy's perspective. Anchoring and mirror-imaging bias help planners simplify problems when faced with unfamiliar situations, but open up the possibility of the enemy countering friendly strengths in unexpected ways. Understanding what

[78] Lambeth, 283.

airpower means to the enemy may not entirely prevent fundamental surprise, but may help air planners adjust course once they discover their current options lack relevance.

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